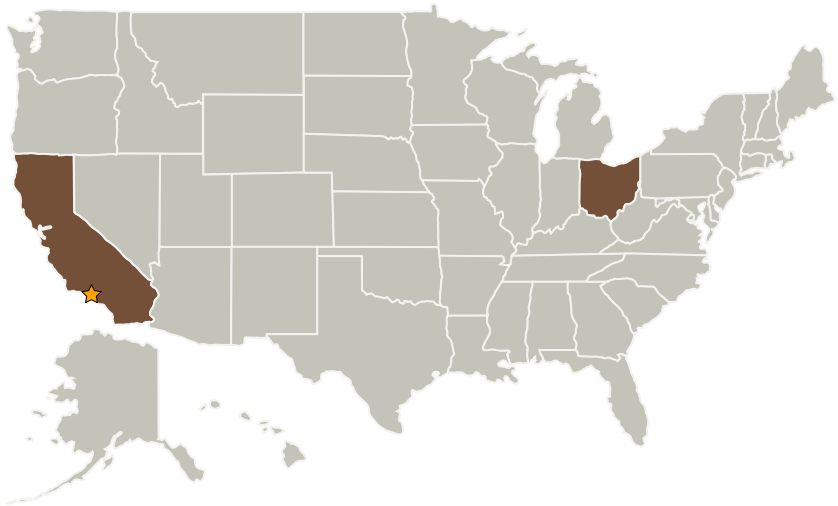
Dual Polarization Multi-Frequency Antenna Array, Phase II

Completed Technology Project (2009 - 2011)

Project Introduction

NASA employs various passive microwave and millimeter-wave instruments, such as spectral radiometers, for a wide range of remote sensing applications from measurements of the Earth's surface and atmosphere to cosmic background emission. These instruments such as the HIRAD (Hurricane Intensity Radiometer), SFMR (Stepped Frequency Microwave Radiometer), and LRR (Lightweight Rainfall Radiometer), provide unique data accumulation capabilities for observing sea surface wind, temperature, and rainfall and significantly enhance the understanding and predictability of hurricane intensity. These microwave instruments require extremely efficient wideband or multiband antennas. For the Phase I SBIR program Spectra Research, Inc. teamed with Scientists from the Georgia Tech Research Institute (GTRI) to apply new technological antenna advances and new antenna design tools toward solving the challenge of designing small, multi-function antennas that reduce the space, weight, and drag demand on the platform. The results of the analysis and numerical design in the Phase I program show strong potential for an antenna array that will satisfy all design requirements of a high efficiency replacement for the Hurricane Intensity Radiometer (HIRAD) array. Multiple fragmented aperture arrays were employed in a thin antenna element to achieve exceptional gain (within 0.2 dB of the aperture limited gain) over the entire band from 4-7 GHz with a superb VSWR of < 1.5.

Primary U.S. Work Locations and Key Partners



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Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Center / Facility:

Jet Propulsion Laboratory (JPL)

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

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Organizations Performing Work	Role	Type	Location
★Jet Propulsion Laboratory(JPL)	Lead Organization	NASA Center	Pasadena, California
Spectra Research, Inc.	Supporting Organization	Industry Women-Owned Small Business (WOSB)	Dayton, Ohio

Primary U.S. Work Locations	
California	Ohio

Project Transitions

October 2009: Project Start

June 2011: Closed out

Project Management

Program Director:

Jason L Kessler

Program Manager:

Carlos Torrez

Technology Areas

Primary:

- TX08 Sensors and Instruments
  - TX08.1 Remote Sensing Instruments/Sensors
    - TX08.1.4 Microwave, Millimeter-, and Submillimeter-Waves